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ABSTRACT

Educators at one Georgia high school identified improved student proficiency in critical thinking as a major school goal. In order to infuse thinking skills instruction across the curriculum, a nine-member interdisciplinary team of teachers worked with a learning consultant for 1 year. Collaboration resulted in the development of a new model for systemic infusion of critical thinking skills, the CRTA model. The CRTA acronym derives from four recursive, interdependent steps that are designed to enhance students' thinking skills: Create the right climate (create a nonthreatening environment, model a positive attitude, and commit time and resources); Reflect on thinking/Revise instructional objectives (test beliefs about thinking, define critical thinking, and revise instructional objectives); Teach thinking skills/dispositions explicitly (examine assumptions about thinking skills, find the time to teach thinking skills, teach thinking skills explicitly, and teach thinking dispositions); and Assess critical thinking for real-life use (specify what is to be assessed, use comprehensive methods of assessment, provide frequent assessments with feedback, and use assessment results to improve learning). (Contains 30 references.) (SM)

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Running head: The CRTA Model

Title: Theory into Practice: Best Practices For A School-wide Approach to Critical Thinking Instruction

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Abstract

Educators at Rabun County High School in northeast Georgia identified improved student proficiency in critical thinking as a major school goal. In order to infuse thinking skills instruction across the curriculum, a nine-member interdisciplinary team of teachers worked closely with an invited learning consultant for one year. Collaboration resulted in the evolution of a new model for systemic infusion of critical thinking skills—the CRTA Model. This paper describes the change process and the Model that evolved.

Theory into Practice: Best Practices For A School-wide Approach To Critical Thinking Instruction

Educators at all grade levels continue to cite the development of critical thinking skills as an important outcome of education (Elliott, Kratochwill, Littlefield Cook, & Travers, 2000; Slavin, 1997; Woolfolk, 1995). As Dewey (1910) maintained long ago, learning is the most important goal of schooling, and learning is a consequence of thinking. Ergo, if educators can enhance thinking skills, enhanced learning will result.

Many researchers (e.g., Perkins, 1989; Sternberg, 1984; Feuerstein, 1980) have demonstrated that thinking skills can be improved. Some researchers have advocated the use of stand alone thinking skills programs (e.g., Feuerstein's ,1980, Instrumental Enrichment Program or de Bono's, 1983, CoRT Thinking Program)--commercial programs typically offered apart from the content of a specific curriculum. Other researchers have advocated a systems approach to thinking skills instruction—that is, the infusion of thinking skills instruction into all subjects and all grade levels of an existing curriculum.

Barry Beyer (1997) described one comprehensive, school-wide approach to improved critical thinking: 1) provide thoughtful classrooms; 2) make thinking visible and explicit; 3) guide and support student thinking; and 4) integrate instruction on thinking into subject-matter learning. Beyer suggested that improving student thinking required using all four approaches in a sustained and recursive manner, and he offered many practical strategies doing so.

But how would a system-wide approach to critical thinking be implemented in a real-world setting? The purpose of this paper is to address this question by examining the recent implementation of a comprehensive, school-wide approach to critical thinking at Rabun County

High School in northeast Georgia. The comprehensive approach that evolved differed significantly from Beyer's (1997) approach and resulted in the evolution of a new model for the school-wide infusion of critical thinking skills--the CRTA Model for School Improvement in Critical Thinking (Kassem, 1999).

Evolution of A New Model

Rabun County High School (RCHS) is a small school in the mountains of northeast Georgia; 39 teachers serve approximately 500 students. In 1997, the faculty completed work on a School Improvement Plan (SIP), using the National Survey of School Excellence (NSSE) as the instrument for self-study. All members of the Rabun community, including students and the general public, participated in the study. Results of the SIP self study revealed that student proficiency in critical thinking strategies and problem solving skills was important to all parties. In an effort to make thinking skill development a priority, the principal and the NSSE chair selected a nine-member interdisciplinary team of teachers. The team had three charges: to develop a plan for improving student proficiency in critical thinking skills, to implement that plan (including the provision of staff development), and to develop methods of assessing critical thinking skills.

The team began its work by familiarizing itself with critical thinking resources, including O'Tuel and Bullard's (1993) Developing Higher Order Thinking in the Content Areas K-12, and by sharing information in weekly meetings. In the spring of 1998, the team invited a specialist/ consultant to campus for the purpose of addressing the topic of critical thinking and for establishing a receptive climate for a school-wide focus on thinking skills. Thereafter, the team

worked closely with the consultant to develop a vehicle for improved student critical thinking skills across the curriculum. The vehicle that evolved was the CRTA Model for School Improvement in Critical Thinking (Kassem, 1999).

The CRTA Model (Kassem, 1999) is similar to Beyer's (1997) comprehensive approach in that it involves four recursive, interdependent modules. A second similarity is that both approaches begin with the step of creating a thoughtful atmosphere, a step that must occur before any others can occur. However, the remaining steps of the CRTA Model differ from Beyer's, most significantly by including assessment as the fourth step. The "CRTA" acronym derives from the following four steps of the model:

1) **C**reate the right **C**limate; 2) **R**eflect about thinking skills and **R**evise instructional objectives; 3) **T**each **T**hinking skills/dispositions explicitly; and 4) **A**ssess critical thinking for real-life use (See Figure 1).

Elaboration of the Model

Step 1. Create the Right Climate

The right climate is a school-wide atmosphere that encourages reflection and critical thought. Such a climate means providing students with meaningful opportunities and strong encouragement to engage in thinking beyond the level of recall. It also means having an attitude that is receptive to change. The faculty at RCHS took the first step in creating the right climate by realizing, as a result of their School Improvement initiative, that they needed to augment student critical thinking skills. This step involved an awareness of what was lacking in the current school climate/curriculum; teachers felt students lacked higher order reading comprehension

skills, analytical skills, and real-life problem solving skills, among other things. This step also involved a group consensus in the community that improved critical thinking skills should become a school goal.

Creating a non-threatening environment. A very important ingredient for the right climate at Rabun High School was the attitude of school leaders. Both the school principal and the NSSE chair proffered an encouraging, supportive, non-threatening attitude. Together they appointed a Critical Thinking Team that included a representative from each discipline, the school counselor, and the school library/media consultant as chair. They provided time lines, guidelines, and resources but did not direct or interfere with the work of the committee. The work of the committee was work by faculty for faculty, and it was therefore much better received than a top-down edict by the principal would have been. The principal said that although faculty implementation of the school-wide focus on critical thinking would be assessed, the results would not be used in a punitive manner at raise/promotion time, and faculty could work together in departments to support each other while making changes. This type of school leader, a leader who minimizes risk while encouraging effort, is vital.

Modeling a positive attitude. School leaders helped establish the right climate at RCHS by: adopting a confident, positive attitude toward the impending changes; modeling how such changes could occur; offering resources, support, and encouragement to colleagues; and developing a reasonable, incremental plan. The plan involved small, manageable suggestions such as the following: rearrange classroom furniture to encourage more discourse; use more higher order questions and longer wait time to encourage deeper discussions; and expect all students, not

just those identified as gifted, to function at the highest levels of Bloom's (1956) Taxonomy.

Committing time and resources. The principal and the Critical Thinking Team further helped establish the right climate by committing faculty time and resources to the improvement of critical thinking skills. The team provided special workshops on critical thinking for all faculty members over the four-day preplanning period in fall of 1998. The invited consultant provided direction the first two days of preplanning by describing the CRTA Model and laying out the team plan for the academic year. During the second two days of preplanning, team members provided sessions in which they elaborated on each step of the CRTA Model and then demonstrated how they intended to focus on critical thinking in their own classrooms. Additional time was allocated during departmental meetings throughout the academic year to share and discuss critical thinking lessons. Furthermore, each department presented on critical thinking implementation at school-wide faculty meetings throughout the year. Interested volunteers attended additional staff development sessions on various related topics throughout the year.

Summary. Step one of the CRTA Model (Kassem, 1999) involves the affective, motivational domain. It requires the learner to develop an open-minded attitude and a willingness to change. As the Rabun County High School experience illustrates, creating the right climate for school-wide improvement in critical thinking is largely a matter of having a non-threatening environment, a positive attitude, and a commitment of the time and resources needed to implement a sound plan.

Step 2. Reflect About Thinking/Revise Instructional Objectives

The second step of the CRTA Model (Kassem, 1999) is a metacognitive one. Teachers

need to start thinking more about thinking processes and to uncover their true beliefs about thinking; they also need to evolve their own definitions of critical thinking. These needs often mean becoming better educated about thinking skills/strategies. Heightened awareness and more information lead to reconsideration of one's own teaching objectives/lesson plans.

Testing beliefs about thinking. The consultant administered self-scoring questionnaires to RCHS faculty members in order to assess their beliefs about critical thinking with such items as the following: 1) Can all students become better critical thinkers? 2) Can higher order thinking skills be taught in all content areas? 3) Does teaching for higher order thinking require explicit instruction in thinking skills, or will students acquire them indirectly? These questions precipitated reflection and discussion. Some faculty members wondered whether critical thinking could be taught in physical education classes or in fine arts classes, for example. Discussion prompted a call for definitions and examples.

Defining critical thinking. Team members discovered that no standard definition of critical thinking exists. Instead, there are many indicators, descriptors, and programs. The consultant supplied the faculty with examples of critical thinking programs and models (e.g., Costa's, 1985, Developing Minds), including the example of one local school system (Gwinnett County Schools) in the process of infusing higher order thinking across the curriculum. The Critical Thinking Team adopted a simple, working definition of critical thinking to share with the whole faculty during preplanning: *Critical thinking is rationally and reflectively deciding what to do or what to conclude* (adapted from Norris & Ennis, 1993). This definition makes clear that critical thinking refers to the quality of thinking—that is, to the degree to which the characteristics

of rationality and reflectivity are present.

Revising instructional objectives. The team discussed numerous higher order process skills and strategies, including analysis, pattern recognition, metacognition, and evaluation. The consultant distributed detailed handouts on Bloom's (1956) Taxonomy to help with the identification of higher order cognitive objectives. Each team member agreed to identify one process skill or strategy he/she wished to focus on for the entire academic year. Team members identified a variety of higher order process skills, as illustrated in Figure 2.

Each team member then rewrote one or more instructional objectives to reflect a more explicit focus on the higher order skill he/she had identified. The consultant emphasized that this step did not require starting over with lesson plans; rather, it involved identifying objectives from content already being taught and rewording current objectives to put an emphasis on the thinking skill(s) identified. Peer review and scaffolding by the consultant helped each member refine instructional objectives. Team members decided they could coach their faculty colleagues through the same process in the fall.

Summary. Step two of the CRTA Model (Kassem, 1999) requires metacognitive processes. The practitioner must define what he/she means by "critical thinking" and must examine current beliefs and practices about thinking. As the Rabun County High School experience illustrates, step two involves identifying beliefs/assumptions about thinking, defining the specific thinking skills or strategies to be taught, and revising instructional objectives to target specific thinking skills.

Step 3. Teach Thinking Skills/Dispositions Explicitly

The third step of the CRTA Model (Kassem, 1999) involves instructional processes--focused instruction; scaffolding; and practice of the thinking skills, strategies, and dispositions identified in revised objectives. Teachers should not assume that students already know how to think critically and accurately simply because some of the higher order tasks they have been assigned require higher order skills. Thinking skills need to be taught explicitly and then practiced repeatedly for true learning to occur (Beyer, 1997; Perkins, 1992). This step requires teachers to examine underlying assumptions about thinking; to identify an appropriate time and content for introducing thinking skills; and to provide explicit instruction on, and practice of, specific thinking skills/dispositions.

Examining assumptions about thinking skills. RCHS teachers said they had assumed their students already knew how to draw inferences or conclusions from required readings and were surprised to discover how many could not do so. The consultant facilitated a discussion about the difference between requiring students to perform higher order tasks, which RCHS faculty were already doing, and actually teaching students the thinking skills/dispositions needed to perform those tasks well. The consultant drew an analogy using the skill of writing--teachers do not expect students to become good writers simply by assigning tasks that involve writing; rather, teachers assume students need to know and to practice the fundamentals of good writing in order to perform tasks that require good writing. Likewise with thinking skills, teachers should assume students need to learn and to practice the fundamentals of good thinking in order to exhibit good thinking (Paul, 1990).

Finding the time to teach thinking skills. Team members argued that it was already a challenge to teach for all of the objectives in Georgia's Quality Core Curriculum (some of which address higher order thinking) in the time allotted; they were concerned that a heightened focus on thinking skills would mean omitting other vital content. The team discussed the possibility of requiring students to take a separate course in thinking skills instead of using time in each course to do so; the consultant offered examples of some popular thinking skills programs already available (e.g., de Bono's, 1983, CORT Thinking). Deciding that it might not be the best way to reach all students in all grade levels, team members ruled out the separate course alternative. The consultant then suggested ways to integrate thinking skills instruction into all courses by shifting the focus of lessons to the thinking processes needed to elaborate upon or to evaluate content, instead of focusing on the content itself. This shift of focus need not lead to the omission of content objectives. Rather, the content can become the domain in which the explicitly taught thinking skill is practiced. In this way, students can learn content and hone thinking skills simultaneously.

Teaching thinking skills explicitly. Teaching thinking skills has, in the past, been a covert operation (Paul, 1990). Teachers have assigned students complex projects or tasks that required higher order thinking skills and then evaluated students' products. For example, teachers have assigned term papers, a task that required students to use several higher order skills. The focus of the project, however, was not on the necessary thinking skills, but rather on the product that resulted from their use; thus, the higher order thinking skills were imbedded or implicit in the task. Teaching thinking skills and dispositions explicitly means focusing the lesson on the higher

order skill or strategy to be taught--naming the skill, defining the skill, modeling the skill, practicing/scaffolding the skill, and assessing the skill (Gagne' & Briggs, 1979; O'Tuel & Bullard, 1993). This explicit focus does not require casting out current lesson plans. Many current lesson plans can be modified to change the language and the focus of the lesson without losing the specific content. For example, suppose an English teacher wanted to improve her students' process skills in reading comprehension, as did one RCHS faculty member. This task does not mean sacrificing content objectives; instead, it means accomplishing those objectives differently. Palincsar and Brown's (1984) Reciprocal Teaching strategy could be used to teach the process skills of questioning, summarizing, clarifying, and predicting. The teacher's primary objective is that students learn the four skills. She must name, define, model, give guided practice with, and assess these four skills. But she can use the content of the course to accomplish her critical thinking objectives. Students can apply the process skills to a required reading.

When explicitly teaching complex thinking skills for the first time, the content should be something with which students are already familiar (Beyer, 1997). In this case, a previously read novel would be appropriate. But the focus of the modified lesson must be on the process skills needed for enhanced comprehension, not on the content of the novel. In this way, students get a refresher on content objectives while practicing new thinking skills. Students should continue to practice the new thinking skills with familiar content until those new skills become automatic. Then they should practice with new content, at which time they should assume the role of the teacher in modeling the four Reciprocal Teaching process skills in front of a partner or a group.

Teaching thinking dispositions. At least as important as teaching thinking

skills/strategies is teaching students the habits of mind needed to be strong, independent, lifelong learners. Many experts (including Ennis, 1987; Paul, 1990; Costa, 1991; Perkins, 1984; and Wiggins, 1987) have identified dispositions essential to good thinking. Dispositions are the attitudinal components of thinking, and they include such components as: awareness of one's own thinking; inquisitiveness; fair-mindedness; tolerance; sensitivity; open-mindedness; persistence; and the ability to set goals and make plans. Marzano, Pickering, and McTighe (1993) have established habits of mind standards and rubrics for the assessment of those habits. Facione, Facione, and Giancarlo (1998) developed the California Critical Thinking Disposition Inventory (CCTDI), the only extant commercial instrument that purports to assess critical dispositions.

But how can such dispositions be taught? Beyer (1997) suggests that modeling is the best teaching method. Students imitate what their teachers do. If teachers exhibit open-mindedness and tolerance of others' views, students will learn to do the same. If teachers ask questions aloud about their own conclusions or articulate their own processes of decision making, students will learn to do the same.

The CRTA Model (Kassem, 1999) suggests that teachers should plan lessons that explicitly focus on thinking dispositions, just as they plan lessons that explicitly focus on thinking skills. This explicit focus means naming the critical disposition, defining the disposition, modeling the disposition, giving students guided practice with the disposition, and assessing the disposition.

RCHS teachers took the first step in this process by making their students aware of the school-wide planning/faculty development processes underway and by modeling a willingness to strengthen their own thinking skills throughout the school year. The RCHS Critical Thinking

Committee rewarded the planning and goal setting of their faculty by compiling an end-of-the-year lesson book of teachers' best work on critical thinking. The faculty modeled persistence by continuing work on their critical thinking initiative the following academic year.

Summary. Step three of the CRTA Model (Kassem, 1999) is the explicit teaching of critical thinking skills and dispositions. As the Rabun County High School experience illustrates, step three involves examining underlying assumptions about teaching thinking; shifting the focus of content-driven lessons to thinking skills, strategies, or dispositions; and then naming, defining, modeling, practicing, and assessing the targeted thinking skills and dispositions.

Step 4. Assess Critical Thinking for Real-life Use

The fourth step of the CRTA Model (Kassem, 1999) highlights the importance of appropriately assessing higher order thinking skills. In order to improve higher order thinking skills, collecting information and providing feedback about the use of each skill are critical. The feedback loop is vitally important; without appropriate feedback, learning is unlikely to occur (Slavin, 1997). Assessment of critical thinking begins with the articulation of higher order objectives and ends with assessment.

Specifying what is to be assessed. Perhaps the most important task when assessing critical thinking (or anything else) is carefully describing what is to be assessed in terms of learner outcomes--what students should know or be able to do as a result of instruction. The specific action verb used in instructional goals or objectives is the key to clearly conveying both instructional intent and the precise student performance that will provide evidence an objective has been met (Linn & Gronlund, 1995; Gronlund, 1991; Mager, 1975; Slavin, 1997). For

example, suppose the general goal is for students to demonstrate skill in critical thinking. Two specific objectives using action verbs to indicate an observable, higher order skill/performance might include the following: 1) the student distinguishes between fact and opinion; 2) the student draws valid conclusions from the information provided.

To help RCHS faculty restate instructional objectives in this manner, the consultant asked team members to work in pairs. Faculty pairs used examples from their own lesson plans and engaged in dialogue about the clarity of their own outcome statements. Discussion led to the realization that the right time to think about how students will be assessed on objectives is when those objectives are being developed. This realization led to discussion of the various methods available for assessment of higher order objectives.

Using comprehensive methods of assessment. Assessment experts suggest several guidelines for the effective assessment of higher order (or any) objectives: 1) match instructional objectives to the assessment method that provides the most direct evidence of goal attainment; 2) use multiple assessment methods for obtaining samples of student performance; and 3) use authentic assessments to emphasize application in real-world settings (Linn & Gronlund, 1995; Stiggins, 1994; Wiggins, 1998).

The specific action verbs used in instructional objectives are the keys to making an appropriate match between objectives and methods of assessment (Linn & Gronlund, 1995; Stiggins, 1994). For example, if the higher order objective is for students to **distinguish** between fact and opinion, the assessment method selected should have students **perform** an action, not just **describe** how to perform an action. Thus, students might be given a series of statements

(about any content) and asked to decide whether each statement is a fact or an opinion. This type of assessment provides **objective** evidence regarding student performance; i.e., a panel of experts could agree on whether statements were facts or opinions.

In order to obtain additional evidence of student performance on this same objective, students might be asked to make presentations containing only supportable facts (about any content) and to develop criteria for a self-assessment of their factual presentations.

In order to emphasize the use of critical thinking skills in real-world settings, students might be asked to evaluate critically the claims made in television commercials for their degree of accuracy and inclusion of factual evidence. Using such an authentic assessment helps students see the relevance and usefulness of what they are learning, thus increasing student interest and motivation (Wiggins, 1998).

The latter two methods of assessment provide **subjective** evidence regarding student performance; i.e., there would be more than one "correct" performance, necessitating a reasoned judgment on the part of assessors to determine whether or not the outcome had been met.

Given this instructional objective, all of the previously mentioned methods of assessment would be useful and effective. The most valid assessments of student learning combine multiple assessment methods (Linn & Gronlund, 1995; Stiggins, 1994).

RCHS faculty determined that test scores on the critical thinking component of the Georgia High School Graduation Test (GHSGT) would be one way to assess higher order objectives (an objective method). They also decided to use performance assessments (a subjective method) in specific courses. One English Department member, for example, had students create

collages depicting their understanding of an assigned novel; students then presented oral interpretations of their collages to classmates. Presentations were assessed using rating sheets.

RCHS faculty further assessed their progress in attaining a school-wide focus on critical thinking by departmental presentations at faculty meetings throughout the year; faculty discussions in departmental meetings; the compilation of a critical thinking lesson plan book; and completion of an end-of-the-year self assessment form, developed by the consultant. This combination of assessment methods provided a comprehensive sampling of how well learning outcomes were met.

Providing frequent assessments with feedback. Many teachers gather information about learners' progress toward instructional objectives continuously, but three major time intervals are critical periods for data collection and feedback--before, during, and after instruction (Slavin, 1997). Assessment prior to instruction is designed to tap students' prior knowledge/skill in critical thinking and to gauge student comfort level with the topic. Teachers often engage students in an informal discussion to assess prior knowledge, as did the consultant with RCHS Critical Thinking Team members during the first meeting. The consultant learned that team members already had some background knowledge in the area of critical thinking, but they were uncomfortable about impending changes. Team members needed to air their fears and concerns and to have some assurance that the impending changes would have positive results. Thus, the first feedback supplied by the consultant related to the learners' affective domain.

Assessments during instruction answer the question "how are we doing?" They can be formal, such as quizzes or graded group work, or informal, such as class discussions. Both

teacher and classmates provide the learner information about how well he/she is progressing toward instructional objectives (Slavin, 1997; Wiggins, 1998). At Rabun County High School, the consultant provided committee members with instruction/feedback for several months, at regular intervals. When they were ready, faculty members began to provide information/feedback for each other at monthly departmental meetings. Faculty in each department also made monthly presentations to the whole faculty on how their department was approaching instruction in thinking skills.

Assessments after instruction answer the question "how did we do?" Summative assessments are often more formal, such as final exams, parent conferences, or graded projects (Slavin, 1997; Wiggins, 1998). At Rabun County High School, scores on the critical thinking component of the GHSGT served as one summative assessment. The resource book of critical thinking lesson plans served as a second summative assessment. The consultant provided Rabun faculty members with a third summative tool--a self-assessment questionnaire containing the following four components: 1. In what way(s) did you create a climate for critical thinking in your classroom? 2. What specific goals/objectives for critical thinking did you set? 3. Describe the specific thinking skill(s)/dispositions you taught your students and the teaching method used to teach them and 4. Attach sample student work on your critical thinking assessments and describe what you learned from this process.

Using assessment results to improve learning. The primary purpose of assessment is to improve learning (Linn & Gronlund, 1995; Wiggins, 1998). The principal, the NSSE chair, the Critical Thinking Team members, and the consultant observed faculty presentations, student

work, and revised lesson plans and made suggestions for improvement. Analyses of longitudinal information, both quantitative and qualitative, are needed to draw conclusions about learning.

Summary

The purpose of this paper was to describe the evolution and initial implementation of a new model for a school-wide approach to improving critical thinking skills--the CRTA Model (Kassem, 1999). The Model evolved as a result of collaboration between a team of secondary educators and an invited consultant. Implementation of the Model included the use of four interdependent steps to enhance students' thinking skills: **C**reate the right **c**limate; **R**eflect on thinking/**R**evise instructional objectives; **T**each thinking skills/dispositions explicitly; and **A**ssess critical thinking for real-life use. Subsequent articles will address results after one year of implementing the CRTA Model.

Best Practices [illegible] a School-Wide [illegible]proach to Cr[illegible]l Thinking

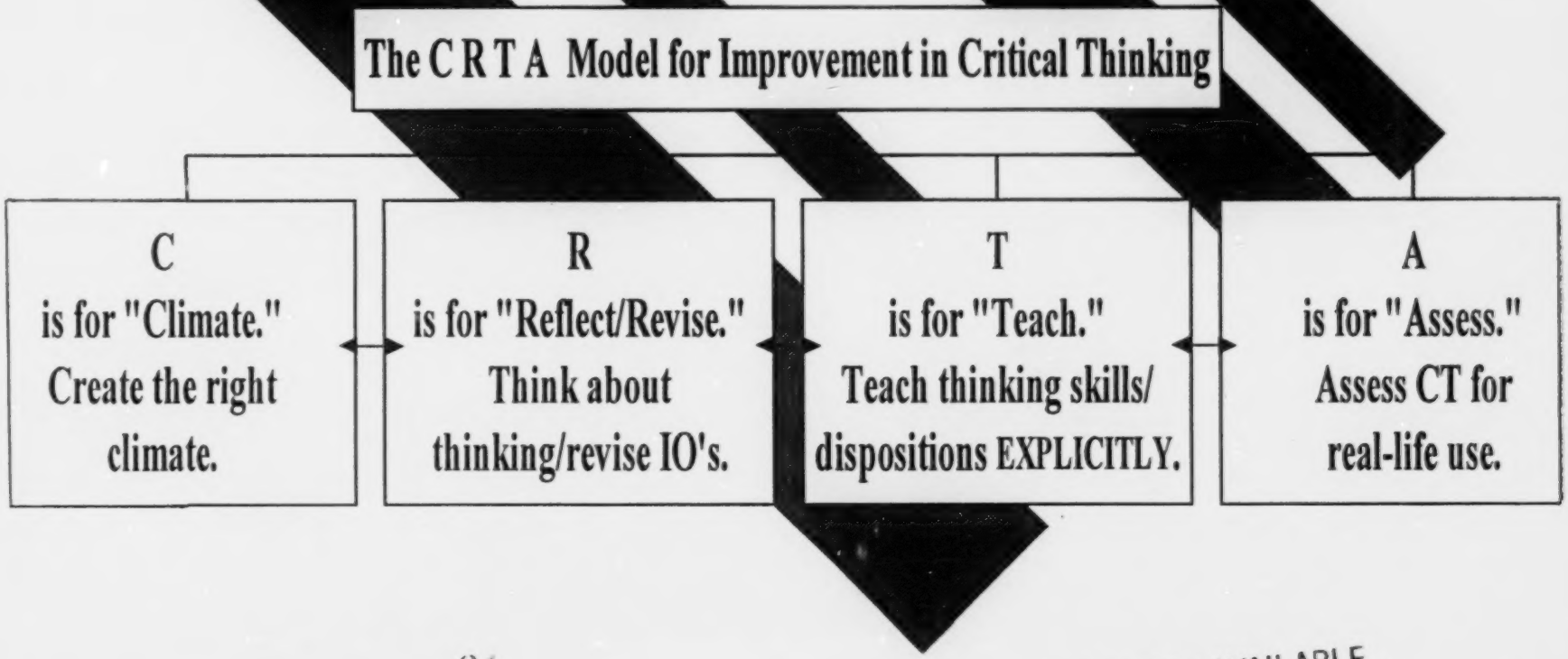

Figure 1

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Figure 2

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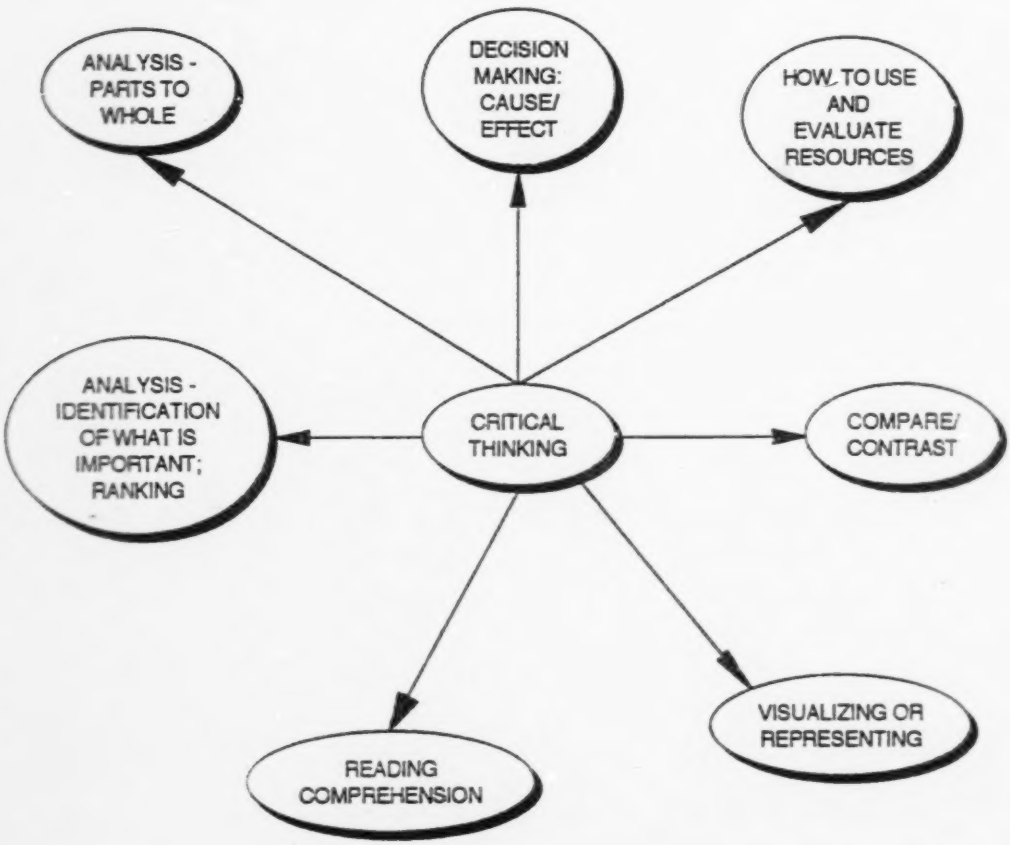
BEST PRACTICES FOR A SCHOOLWIDE APPROACH TO CRITICAL THINKING

CRITICAL THINKING PROCESS SKILLS SUGGESTED BY CT COMMITTEE MEMBERS


ANALYSIS - PARTS TO WHOLE
DECISION MAKING: CAUSE/ EFFECT
HOW TO USE AND EVALUATE RESOURCES
ANALYSIS - IDENTIFICATION OF WHAT IS IMPORTANT; RANKING
CRITICAL THINKING
COMPARE/ CONTRAST
READING COMPREHENSION
VISUALIZING OR REPRESENTING

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